STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33424 F.A. PROJECT	4.1.1 I.D. NO. B-4060
COUNTY CATAWBA	PPIDCE NO 17
PROJECT DESCRIPTION. ON SR 1486 OVER	
SITE DESCRIPTION	

STATE STATE PROJECT REPERENCE NO. N.C. 1 17 B-4060 STATE PROJ. NO. F. A. PROJ. NO. P.E.

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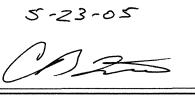
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INVESTIGATED BY J.E. BEVERLY PERSONNEL J.K. STICKNEY C.L. SMITH C.B. LITTLE C.B. LITTLE D.K. BRATTON SUBMITTED BY R.W. TODD APRIL 2005

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DRAWN BY: T.A. MECHUM

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

 ID
 STATE PROJECT NO. SHEET NO. TOTAL SHEETS

 B-4060
 33424.1.1
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DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

				SOIL AND ROO	CK LEGEND, TERM	s, symb	OLS, AND AB	BREVIA	ATIONS	
	SOIL DESCRIPTION			GRADATION					ESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONS WHICH CAN BE PENETRATED WITH A CON	SOLIDATED, SEMI-CONSOLIDATED OR WEATHER	RED EARTH MATERIALS YIELDS LESS THAN	UNIFORM- INDICATES THAT SOIL POORLY GRADED)	D REPRESENTATION OF PARTICLE SIZES FR PARTICLES ARE ALL APPROXIMATELY THE	SAME SIZE. (ALSO	ROCK LINE	INDICATES THE LEVEL AT	WHICH NON-CO	WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL, SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA,
CLASSIFICATION IS BASED ON THE AASH	TANDARD PENETRATION TEST (AASHTO T206,0 HTO SYSTEM AND BASIC DESCRIPTIONS GENE	RALLY SHALL INCLUDE:	GAP-GRADED- INDICATES A MIXT	JRE OF UNIFORM PARTICLES OF TWO OR MO ANGULARITY OF GRAINS	RE SIZES.		ASTAL PLAIN MATERIAL, TH		BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	E, AASHTO CLASSIFICATION, AND OTHER PERTI ARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE		THE ANGULARITY OR ROUNDNESS	OF SOIL GRAINS ARE DESIGNATED BY THE	TERMS; ANGULAR,	ROCK MATE	RIALS ARE TYPICALLY DIVI	DED AS FOLOW	/St	ARCILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERI STIFF, GRAV SILTY OL	UX, MOIST WITH INTERBEDOED FINE SAND UN'ERS,HIGHY PLAS	STAC, A-7-6	SUBANGULAR, SUBROUNDED, OR F	OUNDED.		Weathered Rock (WR)	DATA PER	N-COASTAL PLA R FOOT.	NIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
····	D AND AAȘHTO CLASSIFIÇA	TION		MINERALOGICAL COMPOSITIO		CRYSTALLINE	FINE	E TO COARSE	GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERI CLASS. (55% PASSING *20		ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUART WHENEVER THEY ARE CONSIDERE	Z, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE U D OF SIGNIFICANCE.	SED IN DESCRIPTIONS	ROCK (CR)		JLD YIELD SPT EISS, GABBRO, S	REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, CHIST, ETC.	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3		A-1, A-2 A-4, A-5		COMPRESSIBILITY		NON-CRYSTALI			GRAIN METAMORPHIC AND NON-COASTAL PLAIN K THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-6 A-1-6 A-2-4 A-2	2-5 A-2-6 A-2-7 A-7-8 A-7-8	A-3 A-6, A-7	SLIGHTLY COMPRESSIE MODERATELY COMPRES		LESS THAN 30	ROCK (NCR)	INCL	LUDES PHYLLI	FE, SLATE, SANDSTONE, ETC. EDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE,
SYMBOL 000000000000000000000000000000000000			HIGHLY COMPRESSIBLE	LIQUID LIMIT	GREATER THAN 50	SEDIMENTARY (CP)	ROCK SPT		CK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
% PASSING # 10 50 MX		RANULAR SILT- MUCK,		PERCENTAGE OF MATERIAL GRANULAR SILT- CLAY			1 1 1 1 1 1 1 1 1 1		THERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 40 30 MX 50 MX 51 MN		SOILS CLAY PEAT	UKGANIC MATERIAL	SOILS SOILS 2 - 3% 3 - 5% TRA	OTHER MATERIAL CE 1 - 10%	FRESH	ROCK FRESH, CRYSTALS BR HAMMER IF CRYSTALLINE,	RIGHT, FEW JOI	NTS MAY SHOW SLIGHT STAINING ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
	MN 40 MX41 MN 40 MX 41 MN 40 MX 41 MN MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	SOILS WITH		3 - 5% 5 - 12% LIT 5 - 10% 12 - 20% SOM >10% >20% HIG	IE 20 - 35%	VERY SLIGHT	ROCK GENERALLY FRESH, J		D, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	HORIZONTAL. <u>DIP DIRECTION (DIP AZIMUTH) -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX @ 0 0	4 MX 8 MX 12 MX 16 MX No MX	MODERATE ORGANIC SOILS		GROUND WATER		SLIGHT	OF A CRYSTALLINE NATURE ROCK GENERALLY FRESH, J		D AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL AND CAND GRAVE	OR CLAYEY SILTY CLAYEY EL AND SAND SOILS SOILS	ORGANIC MATTER	****	VEL IN BORE HOLE IMMEDIATELY AFTER	DRILLING.	(SLI.)			r. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALLINE ROCKS RING UNDER HAMMER BLOWG.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING		FAIR TO POOR UNSUITABLE	T7 m	ITER LEVEL AFTER <u>24</u> HOURS. VATER, SATURATED ZONE OR WATER BEAR	ING STRATA	MODERATE (MOD.)	GRANITOID ROCKS, MOST FE	ELDSPARS ARE	DISCOLORATION AND WEATHERING EFFECTS. IN DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GO SUBGRADE	000 FAIR TO POOR 5 ≤ L.L 30 : P.I. OF A-7-6 > L.L	PUUR	OM SPRING OR				WITH FRESH ROCK.		SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
	SISTENCY OR DENSENESS			MISCELLANEOUS SYMBOLS		SEVERE	AND DISCOLORED AND A M	AJORITY SHOW	OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTA	TENCY PENETRATION RESISTENCE	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT2)	HOADWAY EMBANKM		IG SAMPLE	(MOD. SEV.)	IF TESTED, WOULD YIELD S		GIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LO	(N-VALUE)	(TUNS/FIF)	SOIL SYMBOL	AUGER BORING	BESIGNATIONS	SEVERE (SEV.)) OR STAINED.ROCK FABRIC CLEAR AND EVIDENT BUT REDUCE IITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME	D <u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT,
GRANULAR MEDIUM MATERIAL MEDIUM		N/A	ARTIFICIAL FILL O	THER THAN	S- BULK SAMPLE SS- SPLIT SPOON		EXTENT. SOME FRAGMENTS IF TESTED, YIELDS SPT N			LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENSE VERY DE	E 30 TO 50		ROADWAY EMBANKM		SAMPLE				OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SO	,,,,	<0.25	INFERRED SOIL BO	UNDARIES MONITORING WEI	ST- SHELBY TUBE SAMPLE	(V. SEV.)			SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT SILT-CLAY MEDIUM			SITEINE INFERRED ROCK LI		RS- ROCK SAMPLE				C REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM,
MATERIAL STIFF	F 8 TO 15	1 TO 2	TTTTT ALLUVIAL SOIL BO	UNDARY ZA INSTALLATION	RT- RECOMPACTED	COMPLETE			IOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND AY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF
(COHESIVE) VERY ST HARD		2 TO 4 >4	25/025 DIP/DIP DIRECTION		R TRIAXIAL SAMPLE CBR - CBR SAMPLE		ALSO AN EXAMPLE,	5001/	HARRIEGO	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TE	EXTURE OR GRAIN SIZE		ROCK STRUCTURES	— SPT N-VALUE			***************************************		HARDNESS	EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE	4 10 40 60 200	270	SOUNDING ROD	REF SPT REFUSAL		VERY HARD	CANNOT BE SCRATCHED B SEVERAL HARD BLOWS OF		SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES ISTS PICK.	PARENT ROCK.
	4.76 2.0 0.42 0.25 0.075 COARSE FINE	0.053		ABBREVIATIONS		HARD	CAN BE SCRATCHED BY K TO DETACH HAND SPECIM		ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS
(BLDR ₂) (COB ₂)	(GR.) (CSE, SD.) (F. SD.)	(SL.) (CL.)	AR - AUGER REFUS 8T - BORING TERM CL CLAY		NDY	MODERATELY HARD	EXCAVATED BY HARD BLO		. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE OGISTS PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 SIZE IN 12' 3'	2.0 0.25	0.05 0.005	CPT - CONE PENET		.Y	MEDIUM	BY MODERATE BLOWS. CAN BE GROOVED OR GOL	UGED 0.05 INC	HES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
	TURE - CORRELATION OF TO	ERMS	DMT - DILATOMETE DPT - DYNAMIC PE	R TEST 7 - UNIT W	EIGHT	HARD	CAN BE EXCAVATED IN S POINT OF A GEOLOGISTS		O PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE GUIDE FOR F	IELD MOISTURE DESCRIPTION	- VOID RATIO	w - MOISTURE		S0FT			BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS IZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
		OUID; VERY WET, USUALLY THE GROUND WATER TABLE	FOSS FOSSILIFEF FRAC FRACTURED	VST - VANE S	HEAR TEST	VERY	PIECES CAN BE BROKEN CAN BE CARVED WITH KN		ESSURE. EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY:
LL LIQUID LIMIT .			FRAGS FRAGMENT MED MEDIUM	S		SOFT			N BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANGE <		REQUIRES DRYING TO IMUM MOISTURE	EQUI	PMENT USED ON SUBJECT F	PROJECT	FI	RACTURE SPACING	·	BEDDING	TOPSOIL (I.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLE + PLASTIC LIMIT .	-		DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	TERM			TERM THICKNESS VERY THICKLY BEDDED > 4 FEET	BENCH MARK: BM2 -BL- STA. 15+12, 75'RT. SPIKE IN BASE OF 20"
OM OPTIMUM MOISTURE	- MOIST - (M) SOLID; AT (OR NEAR OPTIMUM MOISTURE	·	CLAY BITS	X AUTOMATIC MANUAL	VERY WIDE	DE MORE THAN : 3 TO 10 FEE		THICKLY BEDDED 1.5 - 4 FEET	POPLAR ELEVATION: 888.34'
SL SHRINKAGE LIMIT .			MOBILE 8	6' CONTINUOUS FLIGHT AUGER	CORE SIZE:	MODERATI CLOSE	ELY CLOSE 1 TO 3 FEET 0.16 TO 1 FE		THINLY BEDDED 9.16 - 1.5 FEET VERY THINLY BEDDED 9.03 - 0.16 FEET	
		ODITIONAL WATER TO IMUM MOISTURE	☐ BK-51	8' HOLLOW AUGERS	B	VERY CLO			THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	NOTES:
	PLASTICITY		CME-45C	HARD FACED FINGER BITS				IND	JRATION	
	PLASTICITY INDEX (PI)	DRY STRENGTH	L UME-45U	TUNGCARBIDE INSERTS		FOR SEDIMEN	TARY ROCKS, INDURATION IS	THE HARDENI	NG OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC	0-5	VERY LOW	X CME-550		│	FF	RIABLE		WITH FINGER FREES NUMEROUS GRAINS;	
LOW PLASTICITY MED. PLASTICITY	6-15 16-25	SLIGHT MEDIUM		X CASING W/ ADVANCER X TRICONE 27/8* STEEL TEETH	HAND TOOLS:	1			BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGH PLASTICITY	26 OR MORE	HIGH	PORTABLE HOIST		POST HOLE DIGGER	MO	DERATELY INDURATED		AN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; ASILY WHEN HIT WITH HAMMER.	
	COLOR		OTHER	TRICONE TUNGCARB.	HAND AUGER SOUNDING ROD	IN:	DURATED		RE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
I .	LOR OR COLOR COMBINATIONS (TAN, RED		OTHER	CORE BIT	VANE SHEAR TEST				T TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK	K, STREAKED, ETC. ARE USED TO DESCRIE	BE APPEARANCE.	L Giner	OTHER	OTHER	EX	TREMELY INDURATED		AMMER BLOWS REQUIRED TO BREAK SAMPLE; BREAKS ACROSS GRAINS.	
·										



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY P.O. BOX 25201, RALEIGH, N.C. 27611-5201 LYNDO TIPPETT

GOVERNOR SECRETARY

May 4, 2005

STATE PROJECT: 33424.1.1 (B-4060)

COUNTY:

Catawba

DESCRIPTION:

Bridge #17 on SR 1486 over Cline Creek

SUBJECT:

Geotechnical Report – Bridge Foundation Investigation

This is a proposed bridge replacement job for bridge number 17 on SR 1486 over Cline Creek. The new structure will occupy the same location as the existing structure but encompass a much larger area. The proposed structure is a 21" cored slab design with 3 spans at 50', 55', and 50' respectively. The bridge is on a 110 degree skew and proposed bridge width is 40'.

Foundation test borings were performed with a CME-550X drill machine utilizing NW Casing, Tri-Cone roller bit, and automatic drop hammer. The field investigation for this project was conducted in January of 2005.

Physiography/Geology

The project corridor is located in the Piedmont region of North Carolina in Catawba County east of the city of Conover. Geologically this site is underlain by Cenezoic age amphibolite and biotite gneiss rocks of the Inner Piedmont and Chauga Belt. Topography at the site is generally gently sloping.

Site specific soils encountered were artificial fill, roadway fill, alluvium and residual in nature. Artificial fill soils are associated with backfill of a waterline adjacent to End Bent 1 and consist of very soft silty clay (A-7-6) and sandy silt (A-4). Roadway fill soil associated with SR 1486 consists of very soft to soft sandy silty clay (A-7-6, A-6). The field geologist also noted that during drilling operations in roadway fill soil, water was seen coming through cracks in the pavement at the bridge approaches. Alluvial soils consist of very soft to medium stiff clayey sandy silt (A-4) and loose to medium dense sand (A-2-4, A-1-b) with gravel. Quartz gravel was detected at most boring locations near the bottom of the alluvial layer. It is possible that this gravel layer is homogeneous and was missed during sampling in some borings. Residual soils are comprised of medium dense to very dense micaceous silty sand (A-2-4).

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Foundation Materials

End Bent 1:

This bent is located southwest of Cline Creek. Two borings were performed for this bent location and an unknown amount of roadway fill exists in-between the boring locations. Boring EB1-A had to be abandoned due to an unmarked water line which was encountered at approximate elevation 870 feet. Before encountering the water line boring EB1-A was advanced through 22 feet of water line back fill consisting of soft to very soft red-brown silty clay (A-7-6) and clayey silt (A-4) with gravel. Boring EB1-B encountered 13.5 feet of alluvial gray medium stiff clayey sandy silt (A-4) overlying residual soil at approximate elevation 875.0 feet. Residual soil extends for 21 feet and consists of redbrown and gray-white micaceous medium dense to dense silty sand (A-2-4). Weathered rock was encountered below residual soil at approximate elevation 854 feet.

Bent 1:

Two borings were performed for this bent on the southwest end of the creek channel. Roadway fill up to 10.3' feet in thickness overlies alluvial soil and consists of red-orange very soft to soft sandy silty clay (A-7-6). Alluvium is encountered at both boring locations and consists of gray very soft to soft clayey sandy silt (A-4) followed by browngray medium dense micaceous sand with gravel (A-1-b). Residual soil underlies alluvium between elevation 866 and 871 feet, ranges in thickness from 13 to 18 feet, and is comprised of brown-gray-tan-white medium dense to very dense micaceous silty sand (A-2-4). The base of residual soil marks the weathered rock horizon at elevation 853.3 feet. Both borings were terminated after penetrating 12 + feet of weathered rock.

Bent 2:

For this bent location two borings were performed through the roadway fill on the northeastern side of Cline Creek. Roadway fill extends 5 to 10 feet in depth and is comprised of tan-brown soft sandy silty clay (A-7-6). Beneath roadway fill lies 10 to 12 feet of alluvial soil that consists of tan-brown-gray soft micaceous sandy silty clay (A-7-6) and gray, tan-brown-white loose to medium dense micaceous sand (A-2-4, A-1-b) with gravel. The residual soil boundary lies below alluvial soil between elevation 870.85 and 873.05 feet. Residual soils are 14 to 22 feet in thickness and consist of brown-white-gray medium dense to very dense micaceous silty sand (A-2-4). Within the residual soil column of boring B2-B lies a weathered rock seam between elevation 865.85 - 861.85 feet. The continuous weathered rock horizon lies below residual soil at elevation 851.1' in boring B2-A and elevation 856.8 'in boring B2-B.

End Bent 2:

This bent lies northeast of Cline Creek. Two borings performed for this bent location encountered 9 feet of roadway fill which consists of red-orange soft silty sandy clay (A-6) overlying alluvial soil at approximate elevation 882 feet. Alluvium extends for approximately 10 feet and consists of gray very loose to loose clayey sand (A-2-4) with gravel. Residual soil is encountered around elevation 872 feet and is comprised of 14 to 15 feet of tan-white and gray-white medium dense to very dense micaceous silty sand (A-2-4). Weathered rock follows residual soil and is encountered at elevation 857.9 feet in boring EB2-A and elevation 856.45 feet in boring EB2-B.

Groundwater

Groundwater measurements taken more than 24 hours after each boring was performed indicate the static groundwater table lies between elevation 883.7 - 879.1 feet.

Respectfully submitted,

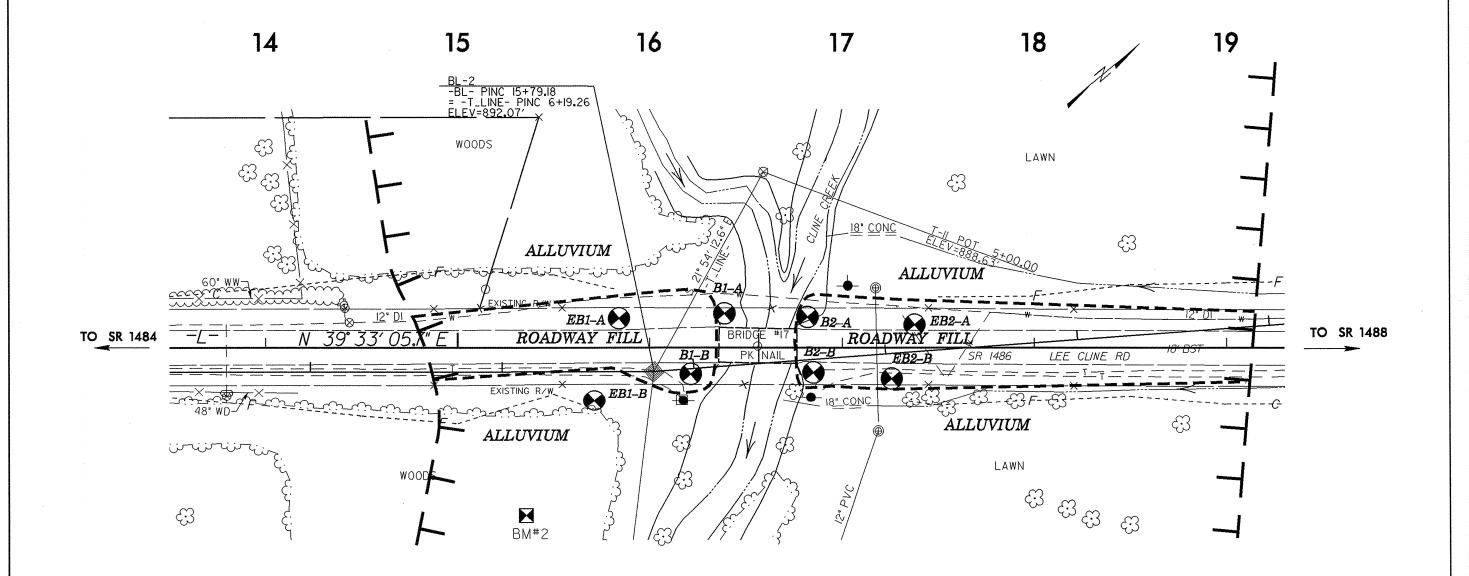
J.E. Beverly, Project Geologist

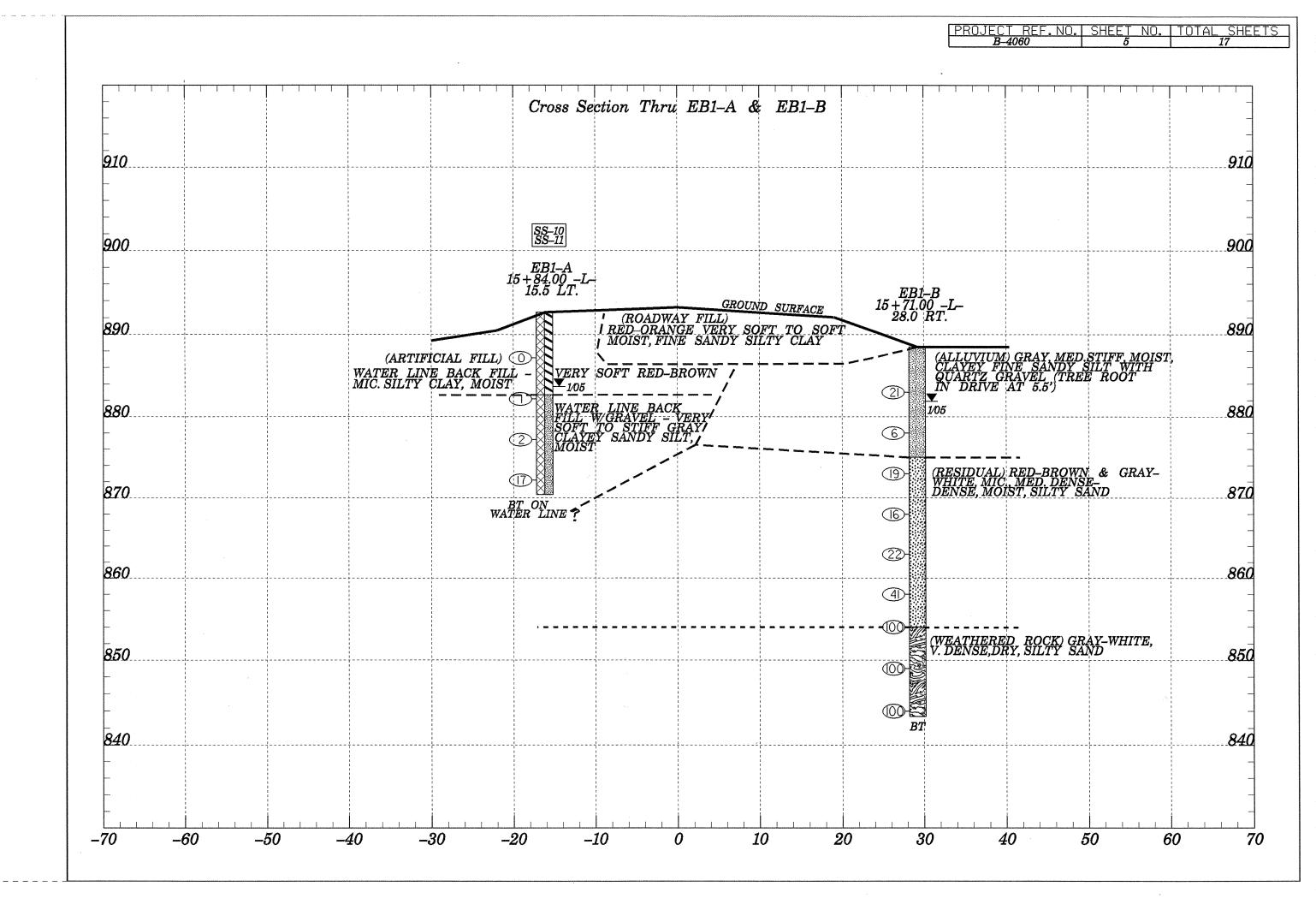
JE Beverly

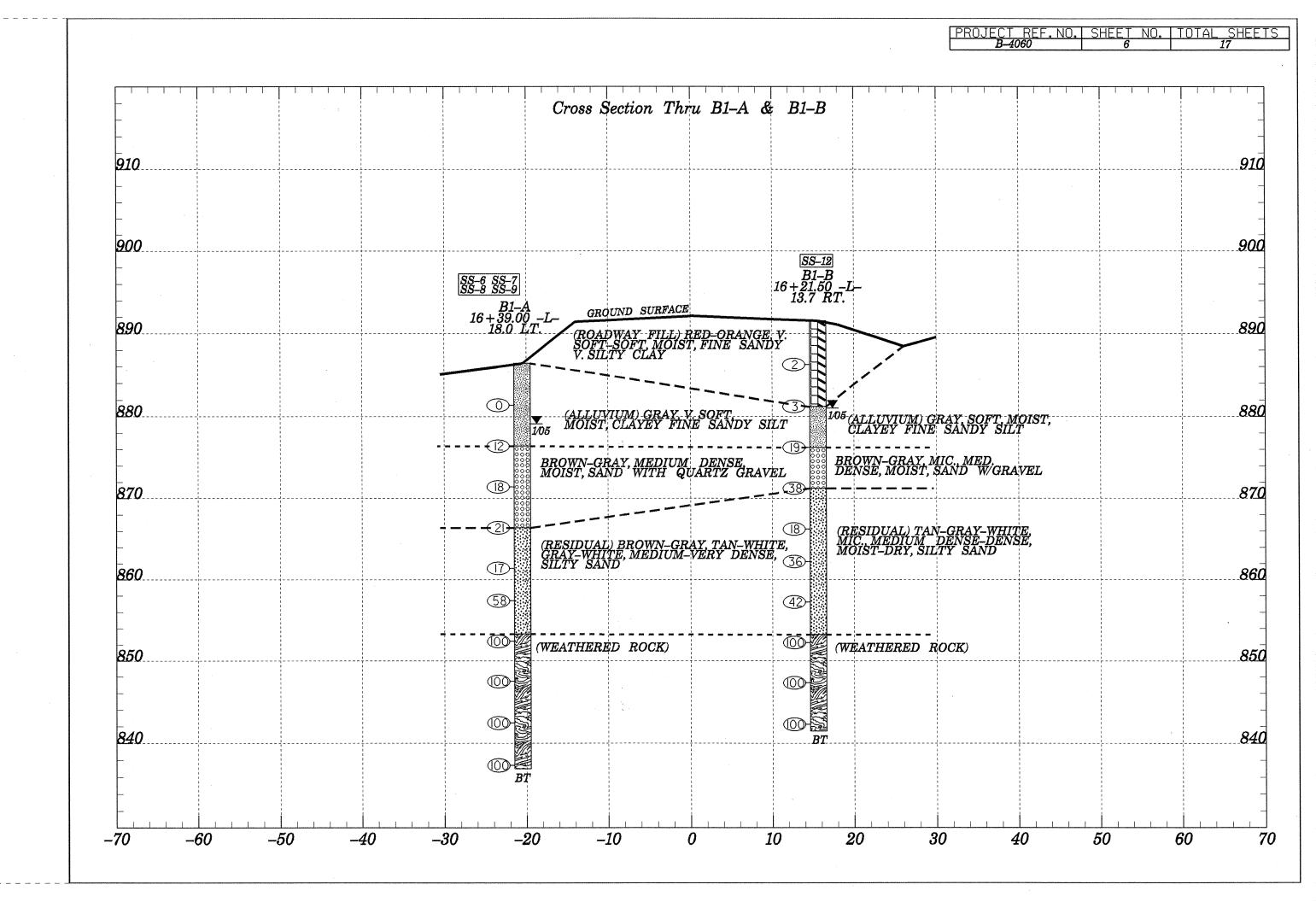
PROJECT REF. NO. SHEET NO. TOTAL SHEETS

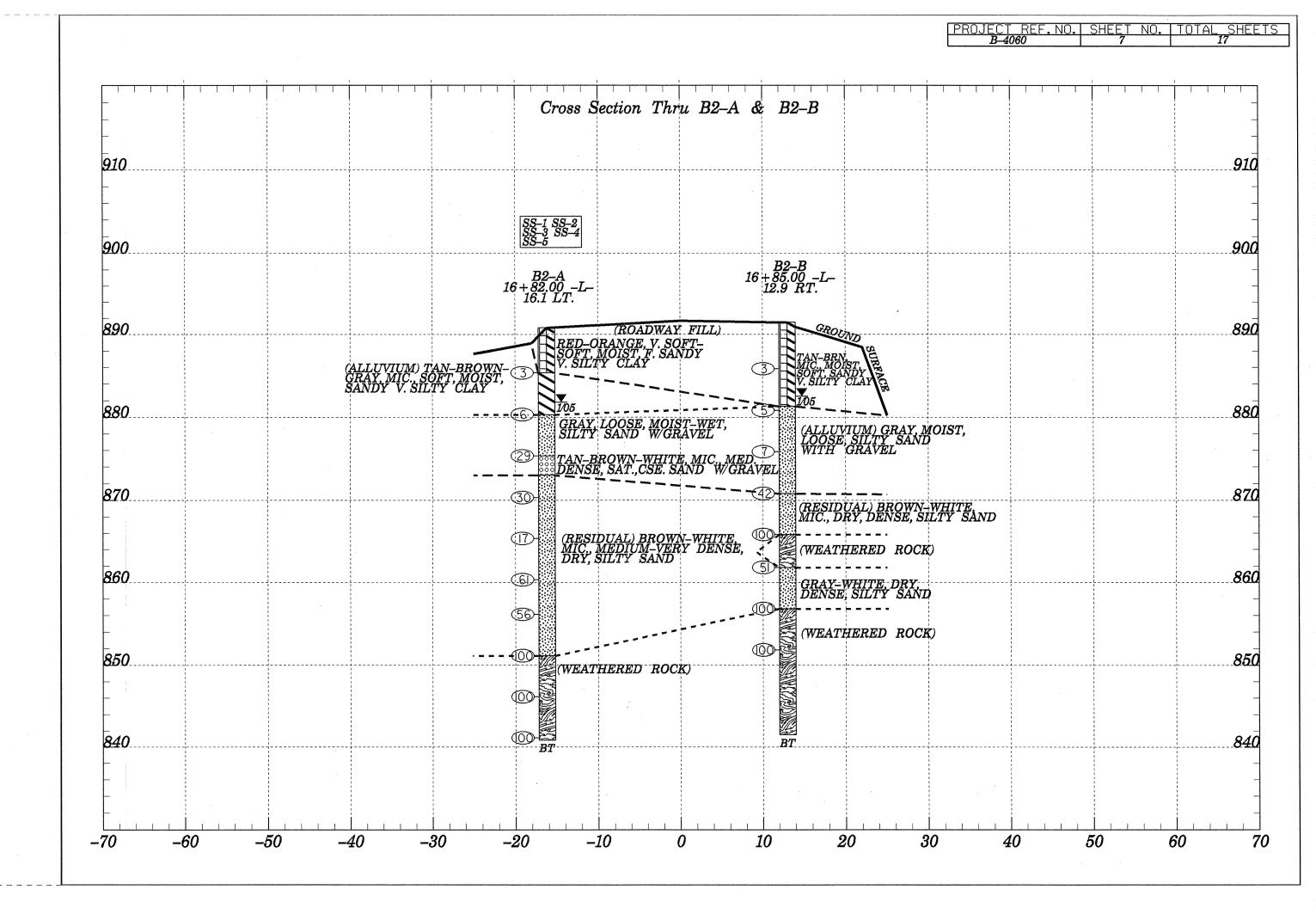
B-4060 4 17

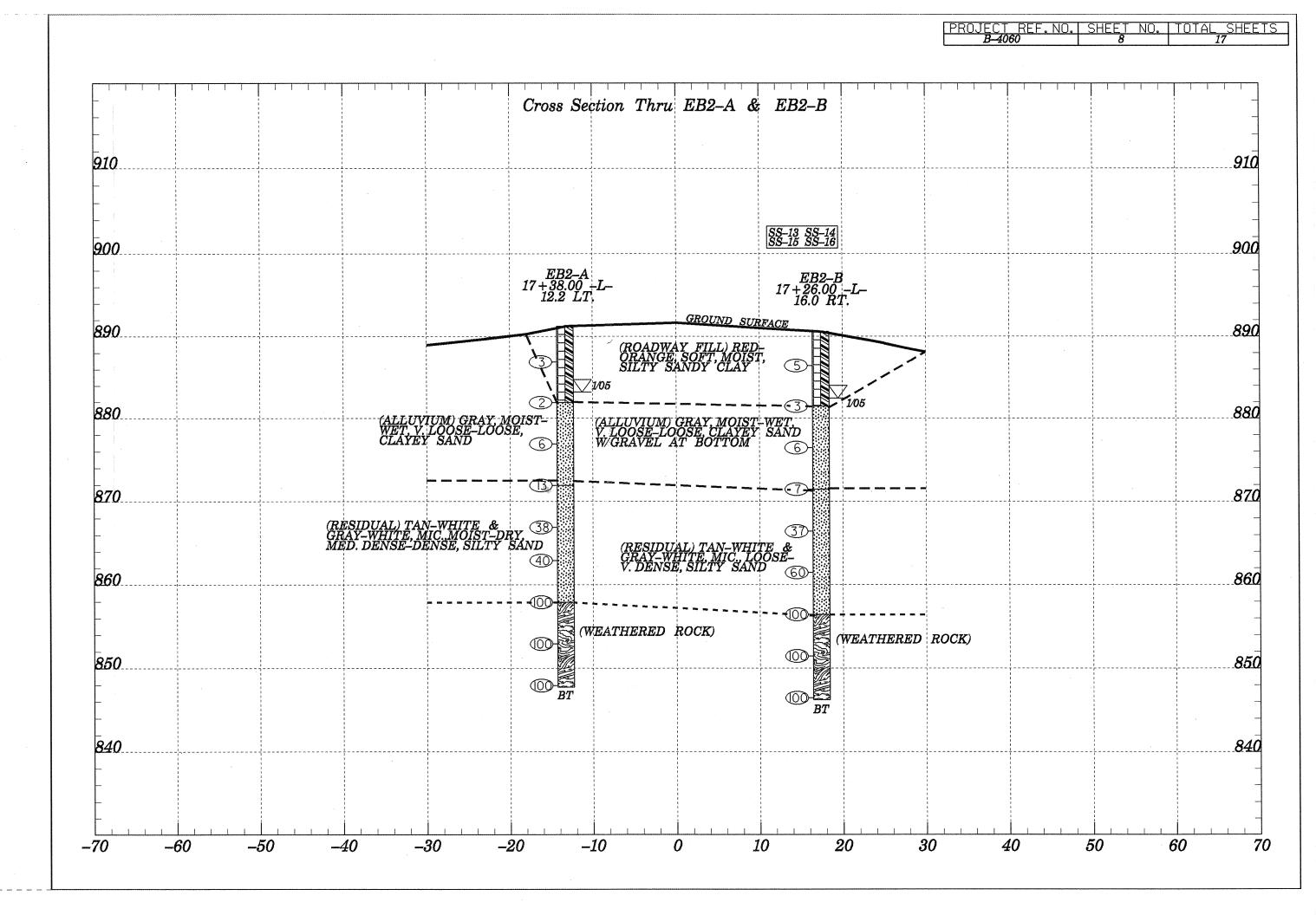
Bridge No. 17 on SR 1486 over Cline Creek
Catawba County

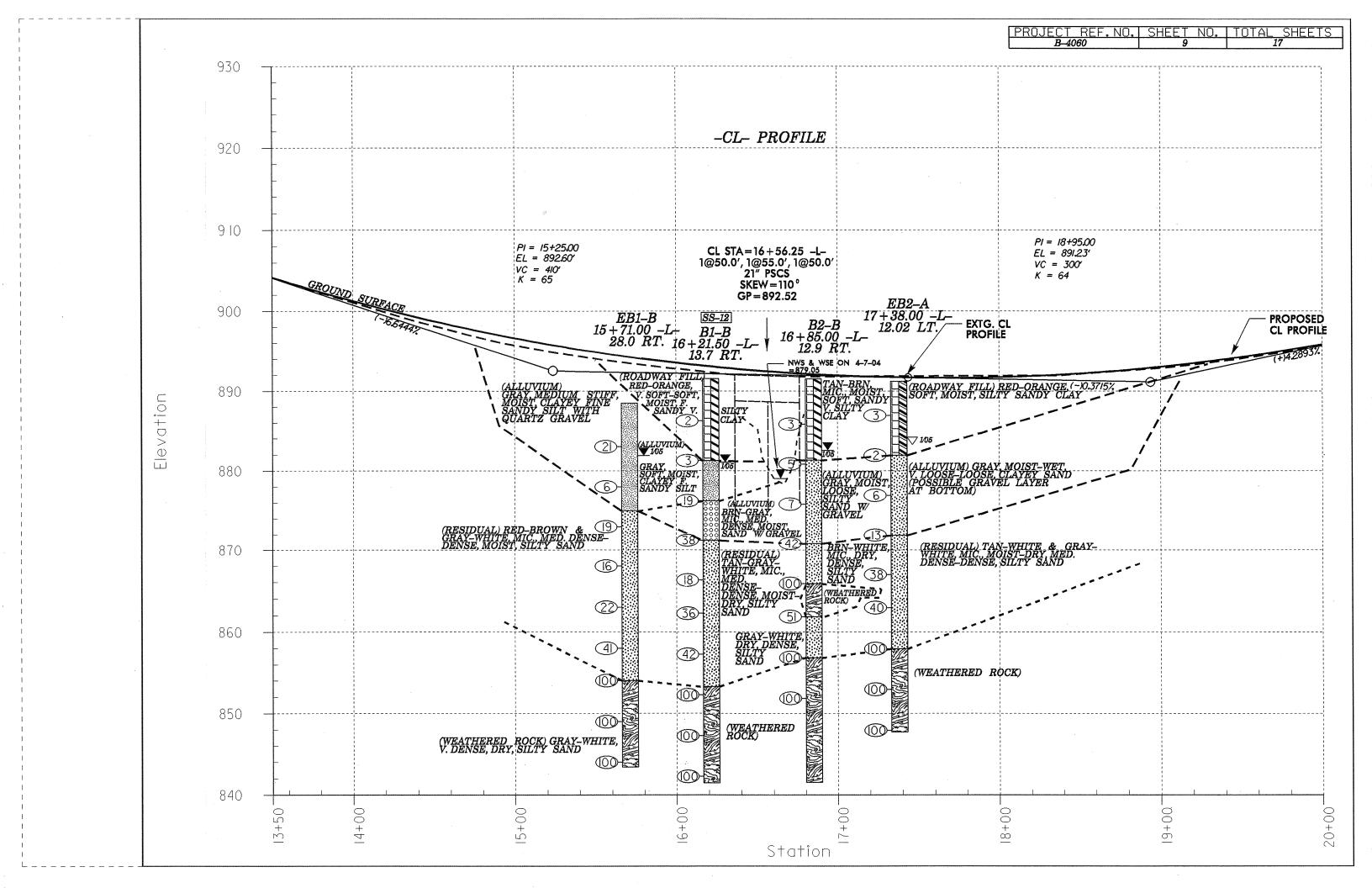












NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

		***************************************				GEUI	ECHN	ICAL L	אוואר או	ORING	LUG			
PROJECT	NO 3342	4.1.1			ID B-4	060	COU	NTY CA	TAWBA	···	GEO	LOC	IST J.K. STICKNE	Y
3			DGE	NO. 1	17 ON	SR 1486 (LEE CLI	NE RD.)	OVER CL	INE CREE	EK			GND WATER
BORING I	NO EB1-A	\		I	NORT	HING 0.0	0			EASTING	0.00			0 HR N/A
ALIGNMI		***************************************			BORIN	G LOCAT	TION 15	+84.000		OFFSET '	15.50ft	LT		24 HR 9.00ft
COLLAR					TOTA	L DEPTH	22.30ft		START DA	TE 1/13/0	5		COMPLETION D	ATE 01/13/05
DRILL MA		****					DRILL	METHO	NWCAS	S/TRI-CON	E		HAMMER TYPE	AUTOMATIC
SURFACE	WATER							TO ROC		-		January	Log EB1-A, Page 1 of 1	
ELEV	DEPTH	1	OW (PEN			PER FOO		SAMPLE	MOI			ID ROCK
		6in	6in	6in	(ft)	0 2	25 !	50 7	75 10	0 NO	MOI	Ğ	DESCF	RIPTION
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892.70 -	_						Ğround	Surface_						
					30.1							X 1	ARTIFICIAL FILL	- (WATER LINE
890.00					11000							XV	BACK FILL) -	VERY SOFT
_	5.50	1	0	0	1.0	- 70							RED-BROWN MIC	CACEOUS SILTY AY
_					1.50	*				SS-10	М	M	CL	AT
	_										Y	Ø	÷	
-	10.50	0	0	1	1.0	1.10:::				00.44				
880.00_	_				Ĺ	X				SS-11	М	XІ	WATER LINE I GRAVEL - VERY	SACK FILL W/
_	- 45 50	_		_		lt						X I	GRAY CLAYE	
_	15.50	0	1	1	1.0	¥-2					М			•
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_	20.50	0	1	16	1.0		7					XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		
870.40 -	_					X-						X		
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Sheet 10 of 17

					d Shire birana ya wa	GEOT	ECHN	ICAL L	JNIT B	ORING	LOG			
PROJECT	'NO 3342	24.1.1		1	ID B-4	060	COU	NTY CAT	ΓΑWBA		GEO	LOC	GIST J.K. STICKNE	Y
SITE DES	CRIPTIO	N BRI	DGE	NO. 1	17 ON	SR 1486 ((LEE CLI	NE RD.)	OVER CL	INE CREE	EK			GND WATER
BORING I		3		1	NORT	HING 0.0	0			EASTING	0.00			0 HR N/A
ALIGNMI				1	BORIN	IG LOCAT	TION 15-	+71.000		OFFSET :	28.00ft	RT		24 HR 6.60ft
COLLAR			_		TOTAL	L DEPTH	7			TE 1/24/0			COMPLETION DA	ATE 01/24/05
DRILL MA							DRILL	METHOI	NWCAS	S/TRI-CON	E		HAMMER TYPE	AUTOMATIC
SURFACE	WATER				Toesi			TO ROC		Ta	т	 	Log EB1-B, Page 1 of 1	
ELEV	DEPTH	1	OW (PEN			PER FOO	'I '5 10	SAMPLE	MOI	լ		D ROCK
		6in	6in	6in	(ft)	Ĥ	-	 		o NO	MOI	G	DESCR	IPTION
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888.50 -	_	 -		 -	-		-Ground	Surface-		+			(411104110410	DAX 14551111
	-												(ALLUVIUM) G STIFF, MOIST,	RAY, MEDIUM CLAYFY FINF
	- - 5.50	6	١,	10	1								SANDY SILT V	VITH QUARTZ
	- 0.50	0	9	12	1.0	×	21			*	Y		GRAVEL (TREE) AT !	
880.00_						/-							Ali	5.5)
1 -	_ 10.50	1	2	4	1.0	= Z6 = =								
_	- -					X					М			
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	15.50	7	8	11	1.0		19				М		(RESIDUAL) REI GRAY-WHITE,	
870.00_													DENSE-DENSE	, MOIST, SILTY
	20.50	8	6	10	1.0		6						SA	ND
	_					*					М			
	_													
_	25.50	7	9	13	1.0		_22				м			
860.00_	_						<u> </u>				١٧١			
	30.50	22	15	26	1.0			1						
	_						X-				М		Photos	
_	34.50	100			0.5				100-					
											D		(WEATHER	ED ROCK)
850.00_	-											S	GRAY-WHITE, ' DRY, SIL	VERY DENSE,
	39.50	57	43		0.8				100_		D		DK1, SIL	I I SAND
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843.40 -	44.50	76	24		0.6				100-					
045.40		***********			1	BORING	TERMIN	ATED-A	FETEV	1	D			
						843:4	FA3W 1/1	HERED	ROCK					
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

*****										JRING	_	-		
PROJECT					D B-4			NTY CAT				LOG	IST J.K. STICKNE	T
SITE DES		BRI	DGE I					NE RD.)	OVER CL				***************************************	GND WATER
BORING N		*****			-	HING 0.00				EASTING				0 HR N/A
ALIGNME						G LOCAT				OFFSET		LT	T	24 HR 7.30ft
COLLAR					<u> FOTAI</u>	DEPTH 4				TE 1/13/0			COMPLETION D.	
DRILL MA				·						S/TRI-CON	<u>E</u>		HAMMER TYPE	AUTOMATIC
SURFACE	WATER				7			TO ROC		T=	T==-7	1	Log B1-A, Page 1 of 1	ID DOOL
ELEV	DEPTH	1	OW (PEN		LOWS P		75 10	SAMPLE		ğ		ID ROCK
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	_													
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886.42 -	_				1		-Ground	Surface						
	_												(ALLUVIUM) GR	AY, VERY SOFT,
_	_												MOIST, CLAYEY	FINE SANDY SILT
880.00	5.00	0	0	0	1.0	J-20				SS-6	М			
000.00					1 1	<u> </u>				00-0	₩			
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_	10.00	3	5	7	1.0	12					М	0000 0000 0000	BROWN-GRAY, I	MEDILIM DENSE
_	-					7						0000	MOIST, SAND	WITH QUARTZ
_	- - 15.00	12	9	9	1.0		 18					0000		AVEL
870.00_	- 10.00	'		ľ	'."					SS-7	М	0000		
_	_					f-						0000		
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_	_									SS-8	М			ROWN-GRAY,
_														GRAY-WHITE, DENSE, SILTY
860.00	25.00	5	5	12	1.0	1	7				М			ND
	_										'''			
	29.00	14	26	32	1.0			58		SS-9	D			
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	- - 34.00	38	62		0.9				100			24		
	_ 04.00	30	02		0.5				¹⁰⁰	4	D		(WEATHER	RED ROCK)
850.00												3		
	39.00	29	60	40	0.7				100		_			
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_	44.00	34	66		1.0				100-	1	D			
840.00									1	1				
837.02 <u>-</u>	- - 49.00	100			0.4				100					
037.02					5.7	BUDINE	-T-E-IDA 41A	V4E5-V	EEEU	1	D	H		
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SHEET 11 OF 17

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

				GEOT	ECHN	ICAL U	INIT BO	ORING	LOG			
PROJECT NO 33424.1	.1		ID B-4	060	COU	NTY CAT	AWBA		GEOI	.OG	IST J.K. STICKNE	′
SITE DESCRIPTION B	RIDGE	١٥.	17 ON :	SR 1486 (LEE CLII	NE RD.) (OVER CL	INE CREE	EK			GND WATER
BORING NO B1-B			NORTH	HNG 0.00)			EASTING	0.00			0 HR 10.60ft
ALIGNMENT L			BORIN	G LOCAT	ION 16+	-21.500		OFFSET	13.70ft	RT		24 HR 10.50ft
COLLAR ELEV 891.56	6ft		TOTAL	DEPTH :	50.10ft	S	TART DA	TE 1/25/0)5		COMPLETION DA	ATE 01/25/05
DRILL MACHINE CM	E-550X				DRILL	METHOL	NWCAS	S/TRI-CON	IE		HAMMER TYPE	AUTOMATIC
SURFACE WATER DE						TO ROC					Log B1-B, Page 1 of 2	
ELEV DEPTH	BLOW		PEN			PER FOO		SAMPLE		L OG		D ROCK
6i	in 6in	6ir	า (ft)	0 2	5 5	50 7	5 10	0 NO	MOI	G	DESCH	RIPTION
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<u>+</u>												
891.56					-Ground	Surface						
890.00										囙	(ROADWAY FILL) RED-ORANGE,
<u>+</u>				<u></u>						ĒΝ	VERY SOFT-SOI	T, MOIST, FINE
± 5.30 (0 1	1	1.0	-2						ĖŅ	SANDY VER	SILTY CLAY
<u>+</u>	l			X				SS-2	M	均		
T		_							_			
880.00 + 10.30 1	1 1	2	1.0	3:::					M	1	(ALLUVIUM) GRA	V SOET MOIST
-				-/								E SANDY SILT
Ŧ _{15.30} ₁	0 11	8	1.0	/	19							
‡				X -					M-W	0000		MIC., MEDIUM
‡					<u> </u>					0000 0000 0000	DENSE, MOIST,	
870.00 ± 20.30 1	4 18	20	1.0		38				м	0000		GRAVEL
070.00					/X				l IVI		(RESIDUAL) TAN MIC., MEDIUM I	N-GRAY-WHITE, DENSE-DENSE
± 25.30 1	0 7	11	1.0		-/ 							SILTY SAND
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	14	22	. 1.0		36				D			
860.00												
<u>‡</u> 34.30 1	7 19	23	1.0		1-2	2			_			
<u>+</u>					<i>X</i> -				D			
± 39.30 2	25 55	45								24		
T I	.5 55	45	5 0.9				100-		D		(WEATHER	RED ROCK)
850.00												
± 44.30 4	1 59		1.0									
<u>+</u>							>	9	D		,	
49.30 5	6 44		0.8				 100-					2
841.46 + 49.30 5	44	ļ	0.0					\	 D -			
				Conti	nued on	the next	page					
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							GEOT	ECHN	ICAL (JNIT BO	DRING I	LOG		.,	
PROJ	ECT	NO 3342	4.1.1		I	D B-4			NTY CA				.OG	IST J.K. STICKNE	7
SITE	DES	CRIPTION	BRII	DGE I	NO. 1	7 ON :	SR 1486 (LEE CLII	NE RD.)	OVER CLI	NE CREE	EK			GND WATER
BORI	NG N	NO B1-B		-	N	ORTI	HING 0.00)			EASTING	0.00			0 HR 10.60ft
ALIG	NME	ENT L	•	***************	E	ORIN	G LOCAT	ION 16+	21.500		OFFSET	13.70ft	RT	4	24 HR 10.50ft
		ELEV 891			<u> </u>	OTAI	DEPTH			START DA				COMPLETION DA	
AND DESCRIPTION OF THE PERSON NAMED IN		ACHINE C	Annia Antonia Anna Anna Anna Anna Anna Anna Anna A	****	*****	A MANAGEMENT CONTRACTOR	****************			D NWCAS	/TRI-CON	E		HAMMER TYPE	AUTOMATIC
SURF	ACE	WATER		H .OW (~T	PEN		DEPTH BLOWS F	TO ROC		SAMPLE		П	Log B1-B, Page 2 of 2	D ROCK
ELE	:V	DEPTH	6in		6in	1 1				75 100	3	▼ MOI	٥		RIPTION
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

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PROJECT	NO 3342	4.1.1]	ID B-4	060	COU	NTY CAT	ΓΑWBA		GEO	LOC	GIST J.K. STICKNE	Y
SITE DES	CRIPTION	BRI	DGE	NO. 1	17 ON	SR 1486	(LEE CLII	NE RD.)	OVER CL	INE CREE	EK			GND WATER
BORING N	NO B2-A			1	NORT	HING 0.0	0			EASTING	0.00			0 HR 9.00ft
ALIGNME	ENT L]	BORIN	G LOCAT	TION 16+	82.000		OFFSET '	16.10ft	LT		24 HR 9.00ft
COLLAR	ELEV 890).85ft		7	TOTAI	L DEPTH	50.00ft	5	START DA	ATE 1/12/0	5		COMPLETION DA	ATE 01/12/05
DRILL MA	ACHINE (CME-5	550X				DRILL	METHO	NWCA	S/TRI-CON	E		HAMMER TYPE	AUTOMATIC
SURFACE	WATER	DEPT.	H				DEPTH	TO ROC	K N/A				Log B2-A, Page 1 of 2	
ELEV	DEPTH	BL	OW (CT	PEN	E	BLOWS F	PER FOO	Т	SAMPLE	Y/	വാ	SOIL AN	ID ROCK
ELEV	DEFIN	6in	6in	6in	(ft)	0 2	25 5	50 7	75 10	NO NO	MOI	Ğ	DESCF	RIPTION
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890.85 <u> </u>	F						Ground	Surface						
090.00			†									町	(ROADWAY FILL	.) RED-ORANGE,
_	F											的	VERY SOFT-SO	FT, MOIST, FINE
_	5.50	0	1	2	1.0	3							SANDY VER	Y SILTY CLAY
	ļ			-		X				SS-1	М		(ALLUVIUM) TAN	I-BROWN-GRAY,
	L										Y		MIC., SOFT, MOIS	ST, SANDY VERY
880.00_	10.50	1	2	4	1.0	1-1-6-					84 107			CLAY
	E								<u> </u>	SS-2	M-W		GRAY, LOOSE	
_	<u> </u>												SILTY SAND	WITH GRAVEL
_	15.50	15	11	18	1.0	13.	29			SS-3	SAT	0000	TAN-BROWN-WI	LITE MIC MED
_	F						<u> </u>					0000	DENSE, SAT., CO	
870.00	20.50	7	10	20	1.0		30							VEL/
670.00		·	'	"			X			SS-4	D		(RESIDUAL) BI	
							<i>X</i>						MIC., MEDIÚM-	-VERY DENSE, .TY SAND
_	25.50	5	7	10	1.0	/	7				_		DIXT, OIL	III OAND
_	E					X	<u> </u>				D			
_	- 00.50	00												
860.00	30.50	28	38	23	1.0			61		SS-5	D			•
_	Ē							[- <i>-</i>]					·	
-	34.70	35	33	23	1.0			1.56			D			
_	E													
	39.70	100			0.5				160					
850.00	_ 55.70	100			0.5				2	K	D	\$	(WFATHFF	RED ROCK)
_	E						<u> </u>						(*********	
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	L								5	N	D			
	F								100-					
840.85	49.70	100	<u> </u>	 	0.3		<u> </u>		 	k	D			
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						GEOT	ECHN	ICAL L	INIT B	ORING I	LOG	•	.,	
PROJECT	NO 3342	4.1.1		1	D B-40	060	COU	NTY CAT	AWBA		GEOI	LOG	IST J.K. STICKNE	Y
		BRI	DGE I	NO. 1	7 ON S	SR 1486 (LEE CLI	NE RD.)	OVER CL	INE CREE	EK			GND WATER
BORING N	NO B2-A			I	NORTH	IING 0.00	0			EASTING	0.00			0 HR 9.00ft
ALIGNME	ENT L			1	BORIN	G LOCAT	TION 16-	+82.000		OFFSET	16.10ft	LT		24 HR 9.00ft
COLLAR	ELEV 890).85ft		7	TOTAL	DEPTH	50.00ft	S	TART DA	TE 1/12/0	5		COMPLETION D.	ATE 01/12/05
DRILL MA	ACHINE (CME-5	550X				DRILL	METHOI	NWCAS	S/TRI-CON	E		HAMMER TYPE	AUTOMATIC
SURFACE	WATER	DEPT:	H				DEPTH	TO ROC	K N/A				Log B2-A, Page 2 of 2	
ELEV	DEPTH		OW (CT	PEN	E		PER FOO		SAMPLE	V /	L		ID ROCK
CLCV	DEPIN	6in	6in	6in	(ft)	0 2	25 5	50 7	5 10	NO	MOI	Q G	DESCF	RIPTION
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840.85												H		
_	_					BORING BAD SE	TERMIN	ATED A	EFEA.					
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

										ORING I	_	_		
PROJECT		-			(D B-4			NTY CAT	**************************************			LOG	IST J.K. STICKNE	
5		BRI	DGE I					NE RD.)	OVER CL	INE CREE				GND WATER
BORING N	NO B2-B					HING 0.00				EASTING	0.00			0 HR 9.10ft
ALIGNME		***************************************				G LOCAT		<u>+85.000</u>		OFFSET 1	12.90ft	RT		24 HR 9.00ft
COLLAR					<u> FOTAI</u>	L DEPTH				TE 1/25/0			COMPLETION DA	
DRILL MA		***************************************								S/TRI-CON	E		HAMMER TYPE	AUTOMATIC
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07000	20.70	15	20	22	1.0			2						
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PROJECT	NO 3342	4.1.1		Т	D B-4	_		NTY CAT) () () () () () () () () () (,	LOG	IST J.K. STICKNE	7
			DGE N							NE CREE				GND WATER
BORING N	The second secon				***************************************	HING 0.00	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			EASTING				0 HR 9.10ft
LIGNME	ENT L]	BORIN	G LOCAT	TION 16+	-85.000		OFFSET '	12.90ft	RT		24 HR 9.00ft
COLLAR	ELEV 891	.55ft			ГОТАІ	DEPTH	50.00ft	8	TART DA	TE 1/25/0	5		COMPLETION DA	ATE 01/25/05
	ACHINE C			***************************************		***************************************	DRILL	METHO	NWCAS	/TRI-CON	E		HAMMER TYPE	AUTOMATIC
URFACE	WATER				T==::			TO ROC		T =	1 7		Log B2-B, Page 2 of 2	
ELEV	DEPTH	1	OW C		PEN		BLOWS F		75 100	SAMPLE	MOI	١٥		D ROCK
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

						GEOT	ECHN	ICAL U	JNIT B	ORING	LOG	• • •		
PROJECT	'NO 3342	4.1.1]	ID B-4	060	COU	NTY CA	TAWBA		GEO	LOG	IST J.K. STICKNE	(
SITE DES	CRIPTIO	N BRI	DGE	NO. 1	17 ON	SR 1486 (LEE CLI	NE RD.)	OVER CL	INE CREE	EK			GND WATER
BORING			******			HING 0.00				EASTING				0 HR 8.00ft
ALIGNMI	ENT L				***************************************	IG LOCAT		+38.000	***************************************	OFFSET		LT		24 HR N/A
COLLAR	ELEV 89	1.25ft				L DEPTH			START D	TE 1/26/0			COMPLETION DA	
DRILL M.			55OX				T			S/TRI-CON		-	HAMMER TYPE	
SURFACE								TO ROC	***************************************			*********	Log EB2-A, Page 1 of 1	
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070.00							<u>t</u>						GRAY-WHITE, MI	C., MOIST-DRY,
	_ 24.30	25	18	20	1.0			<u> </u>					MEDIUM DENSE	-DENSE, SILTY
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860.00_														
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GEOTECHNICAL UNIT BORING LOG																	
						IST J.K. STICKNEY	C. STICKNEY										
SITE DESCRIPTION BRIDGE NO. 17 ON SR 1486 (LEE CLINE RD.) OVER CLINE CREEK GND WATER																	
BORING NO EB2-B											0.00		0 HR 7.90ft				
ALIGNMENT L											16.00ft		24 HR N/A				
COLLAR ELEV 890.58ft					TOTAL DEPTH 44.35ft START DAT								COMPLETION DA	COMPLETION DATE 01/26/05			
DRILL MACHINE CME-550X					DRILL METHOD NWCAS/								HAMMER TYPE AUTOMATIC				
SURFACE WATER DEPTH N/A			\	DEPTH TO ROCK N/A								Log EB2-B, Page 1 of 1					
ELEV	DEPTH	BL	OW (CT	PEN	E	BLOWS F	PER FOC	T	SAMPLE	Y /	Ţ		D ROCK			
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890.58 -							_Ground	Surface									
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_	_																
990.00	9.10	0	1	2	1.0	3				SS-14	М						
880.00	_					<u> </u>				33-14	IVI		(ALLUVIUM) GRAVERY LOOSE-LO	Y, MOIST-WET,			
_	- - 14.10	3	3	3	1.0	<u> -</u>	<u> </u>						SAND WITH GRA				
-	- 14.10	J	၁	J	1.0	1.4-6					M-W						
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=	19.10	4	3	4	1.0	-1-7											
870.00_						X:::				SS-15	М		(RESIDUAL) T	AN-WHITE &			
_	- -												GRAY-WHITE, MIC	C., LOOSE-VERY			
-	24.10	7	12	25	1.0		37	1		SS-16	D		DENSE, SI	LIYSAND			
-	-						:: <u>^</u> :			30-10							
	- - 29.10	18	25	35	1.0												
860.00_	- 20.10	10	20	55	1.0			× 60			D						
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850.00_	- 39.10 -	71	29		0.6				100-	1 1	D						
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846.23	- - 44.10	100			0.3												
040.23	- 44.10	100			0.5	BORING	TEDMIN	ATED A	K.7.5.5	1	ם	×2					
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PROJECT: 33424.1.1 B-4060

COUNTY: CATAWBA

SITE DESCRIPTION: BRIDGE NO. 17 ON SR 1486 OVER CLINE CREEK

SOIL SAMPLE DATA

SAMPLE NO.	OFFSET	STATION	DEPTH	AASHTO	·N	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			%
			INTERVAL	CLASS				C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE :
SS-10	15.5 LT.	15+84 (EB1-A)	5.5-7.0	A-7-6(22)	0	48	20	2.4	6.1	51.1	40.4	100	99	93	
SS-11	15.5 LT.	15+84 (EB1-A)	10.5-12.0	A-4(1)	1	28	. 5	7.1	48.3	22.4	22.2	100	98	53	
SS-6	18.0 LT.	16+39 (B1-A)	5.0-6.5	A-4(2)	0	33	9	16.6	44.0	25.3	14.1	100	92	47	
SS-7	18.0 LT.	16+39 (B1-A)	15.0-16.5	A-1-b(0)	18	24	NP	57.8	28.7	9.5	4.0	57	33	10	
SS-8	18.0 LT.	16+39 (B1-A)	20.0-21.5	A-2-4(0)	21	33	NP	35.8	46.3	13.9	4.0	100	82	26	
SS-9	18.0 LT.	16+39 (B1-A)	29.0-30.5	A-2-4(0)	58	32	NP	54.3	32.3	11.3	2.0	86	53	15	
SS-12	13.7 RT.	16+21.5 (B1-B)	5.3-6.8	A-7-6(15)	2	43	15	2.8	12.3	5.05	34.3	100	99	89	
SS-1	16.1 LT.	16+82 (B2-A)	5.5-7.0	A-7-6(19)	3	45	18	3.2	9.1	45.3	42.4	100	98	91	
SS-2	16.1 LT.	16+82 (B2-A)	10.5-12.0	A-2-4(0)	6	26	4	48.1	30.9	12.9	8.1	87	57	22	
SS-3	16.1 LT.	16+82 (B2-A)	1517.0	A-1-b(0)	19	24	NP	83.2	13.3	3.4	0.0	91	30	4	
SS-4	16.1 LT.	16+82 (B2-A)	20.5-22.0	A-2-4(0)	30	34	NP	50.5	38.2	9.3	2.0	99	72	16	
SS-5	16.1 LT.	16+82 (B2-A)	30.5-32.0	A-2-4(0)	76	29	NP	46.3	36.1	13.6	4.0	94	65	22	
SS-13	16.0 RT.	17+26 (EB2-B)	4.1-5.6	A-6(9)	5	38	14	17.0	19.8	28.9	34.3	100	90	69	
SS-14	16.0 RT.	17+26 (EB2-B)	9.1-10.6	A-2-4(0)	3	29	NP	45.1	37.4	7.5	10.1	100	72	22	
SS-15	16.0 RT.	17+26 (EB2-B)	19.1-20.6	A-2-5(0)	7	45	NP	28.5	55.8	13.7	2.0	100	90	24	
SS-16	16.0 RT.	17+26 (EB2-B)	24.1-25.6	A-2-4(0)	37	30	NP	49.1	37.4	10.5	3.0	95	66	18	

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 33424.1.1 TIP NO.: B-4060 COUNTY: CATAWBA
DESCRIPTION(1): BRIDGE NO. 17 ON SR 1486 (LEE CLINE ROAD) OVER CLINE CREEK
 INFORMATION ON EXISTING BRIDGES Information obtained from ☐ Field Inspection ☐ Microfilm (Reel: Position:) ☐ Other
COUNTY BRIDGE NO. 17 BRIDGE LENGTH 40 NO. BENTS 3 NO. BENTS IN: CHANNEL 2 FLOODPLAIN 3
FOUNDATION TYPE: CONCRETE ABUTMENTS
EVIDENCE OF SCOUR(2):
ABUTMENTS OR END BENT SLOPES: EB2-B DUE TO DRAIN PIPE FOR ACCESS TO FIELD (EROSION), EB2-A UPSTREAM SIDE (EROSION) RECENT INSTALLATION OF WATER LINE POSSIBLE FACTOR
INTERIOR BENTS: NONE NOTED
CHANNEL BED: NONE NOTED
CHANNEL BANKS: SLOUGHING / UNDERMINING
* EXISTING SCOUR PROTECTION:
TYPE(3): NONE
EXTENT(4): N/A
EFFECTIVENESS(5): N/A
OBSTRUCTIONS(6) (DAMS, DEBRIS, ETC.): TREES, TREE LIMBS
♦ DESIGN INFORMATION
CHANNEL BED MATERIAL(7) (Sample Results Attached): SAND, GRAVEL, AND BOULDERS
CHANNEL BANK MATERIAL(8) (Sample Results Attached): SS-7, GRAY-BROWN, MIC., MOIST, MEDIUM DENSE, SAND WITH QUARTZ GRAVEL (ALLUVIUM)
CHANNEL BANK COVER(10): MATURE TREES, GRASS, SHRUBS
FLOOD PLAIN WIDTH(11): 14+85 TO 19+25 -L-
FLOOD PLAIN COVER(12): MATURE TREES, GRASS, SHRUBS
STREAM IS: 🖂 DEGRADING 🗌 AGGRADING (13)
OTHER OBSERVATIONS AND COMMENTS: ROADWAY FILL IS VERY SOFT, DRILLING WATER COMING OUT OF CRACKS IN PAVEMENT 15-20' AWAY.

DESIGN INFORMATION CONT.

CHANNEL MIGRATION TENDENCY(14): SLIGHT

GEOTECHNICAL ADJUSTED SCOUR ELEVATIONS (15): Two borings were performed at each bent location. Following are historic scour elevations based on the alluvial / residual soil contact.

At Bent 1 the alluvial - residual horizion for boring B1-A occurs at elevation 866' while the contact in boring B1-B occurs at elevation 871'. For Bent 2 the alluvial - residual boundary occurs at elevation 873' in boring B2-A and 871' in boring B2-B.

At this time the Geotechnical Engineering Unit can find no reason to adjust the theoretical scour predicted on the NCDOT Hydraulic Design Report. Thus the 100 year scour elevation of 870' given for Bent 1 and 860' given for Bent 2 remain unaltered.

REPORTED BY: 1/26/05 DATE: J.K.S. / J.E.B.

INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIPRAP, ETC.)
 (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIPRAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE, PERCENT ROD, DIFFERENTIAL WEATHERING, SHEAR STRENGTH, OBSERVATIONS AT EXISTING STRUCTURES, OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

rev. 9-03